

## REMARKS

1. In response to Examiner's requirement of restriction under 35 U.S.C. § 121, Applicants elect, with traverse, Invention I, Claims 1-15, for prosecution on the merits. MPEP § 803 states: "If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions." Applicants elect with traverse because simultaneous examination of the three groups does not impose an undue burden of examination on the Examiner. There is no serious burden since Inventions I and II fall within the same classification, class 502, and Invention III is drawn to a process of using both Inventions I and II.

In any event, Applicants reserve the right to file divisional applications or take such other action as deemed necessary with respect to the non-elected groups.

2. Claims 1-15 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-41 and 43 of co-pending Application No. 10/431,489. Applicants believe that the Examiner was referring to co-pending Application No. 10/431,189 in her provisional rejection. Applicants believe a typographical error was made because the Examiner's comments appear to concern Application No. 10/431,189. Applicants will address this provisional rejection at a later date.

3. Claims 1-12 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 4,532,231 hereinafter the '231 reference) in view of Liu et al (6,511,938 hereinafter the '938 reference). This rejection is respectfully traversed.

The present invention relates to a silver-based catalyst having a hollow cylinder geometric configuration such that the length-to-outside diameter ratio of the shaped support material is in the range of from about 0.3 to 2 and the internal diameter is in the range upwardly to about 30 percent of the outside diameter of the shaped support material. It has been found that a substantial improvement in catalyst performance, which includes the initial performance in activity and selectivity and also the activity stability and selectivity stability, can be obtained by changing the ratio of the nominal outside diameter to the nominal inside diameter of the hollow cylinder geometric configuration. *Application text*, p. 4, ll. 1-8.

The Examiner states:

"The difference between the reference [the '231 reference] and the claims is that the reference does not disclose that the internal diameter of up to about 30% of the outer diameter. In an example, the inner diameter is 37% of the outer diameter. However, it is noted that the instant claims require "about 30%" which would include values slightly higher than 30%. It is the examiner's position that the amounts in question are so close that it is *prima facie* obvious that one skilled in the art would have expected them to have the same properties." *Office Action*, dated August 9, 2005, page 5, first full paragraph.

The Examiner respectfully errs in her conclusion since the term, "about 30 percent", in the claim language could not be intended to so substantially enlarge the scope of the claims to include a 25 percent increase over the stated upper limit of 30 percent. Further, no authority is provided to support the Examiner's statement that one skilled in the art would expect a shaped support with a 25 percent increase in internal diameter to have the same properties.

The Examiner further states: "[T]he prior art [the '938 reference] recognizes the shape and configuration of the catalyst support to be a result effective variable and therefore, one of ordinary skill would have been motivated to optimize the inner/outer diameters of the cylinder taught by Johnson [the '231 reference] in order to obtain the best results from the catalyst."

One of the recognized exceptions to the general rule that mere optimization of a variable in a known process is obvious occurs when the prior art does not recognize that the parameter optimized is a result-effective variable. *See MPEP § 2144.05; In re Antoine*, 559 F.2d 618, 620 (CCPA 1977).

The '231 reference relates to a catalyst for the production of alkylene oxides comprising silver and an alkali metal supported on a porous support. *U.S. Pat. No. 4,532,231* at col. 1, ll. 30-49; claim 1. There is no generic disclosure in the '231 reference regarding the geometry of the porous support. In the examples of the '231 reference, a single support geometry (8mm long x 8 mm external diameter x 3 mm internal diameter) is utilized. *Id.* at col. 4, l. 21 – col. 8, l. 56.

The '938 reference teaches improving the performance of an alkylene oxide catalyst by adding a cobalt component. *U.S. Pat. No. 6,511,938* at col. 7, ll. 11-19. In the background of the invention, the '938 reference discloses "the size and shape of the support are variable factors and the particular size and shape selected are peculiar to the reactor employed, the gas flow required, and the pressure drop across the reactor." *Id.* at col. 1, l. 67 – col. 2, l. 5.

Further, the '938 reference discloses that, in tubular reactors, supports may be rounded in shape, i.e., spheres, pellets, rings, cross-partitioned rings, tablets and the like, having diameters ranging from about 0.1 inches to about 0.8 inches. *Id.* at col. 13, ll. 30-38. In the Examples of the '938 reference, it is stated: "Unless otherwise specified, carriers are nominally ring shaped having dimensions of about 1/8 x 5/16 x 5/16 inch or about 1/8 x 1/4 x 1/4 inch." *Id.* at col. 24, ll. 26-28. Based on these dimensions, it may be calculated that the carriers have inner diameters which are 40 and 50 percent, respectively, of the outer diameters. As an alternative geometry utilized in the Examples of the '938 reference, cross-partitioned ring cross-sectional carriers are utilized which have a nominal length and diameter of about 0.31 inches. *Id.* at col. 26, ll. 1-3.

The '231 reference is completely silent regarding varying the internal diameter to outside diameter of the shaped support material. Therefore, the '231 reference could not be interpreted to recognize that the ratio of internal diameter to outside diameter of the shaped support material is a result-effective variable.

The '938 reference discloses the size and shape of the support are variable factors; however, the '938 reference does not recognize that the ratio of internal diameter to outside diameter of the shaped support material is a result-effective variable. Specifically, there is no generic disclosure in the '938 reference relating to varying the internal diameter with respect to the outside diameter of the shaped support material. Further, in the data provided in the Examples of the '938 reference, no distinction is made as to when carrier rings having dimensions of about 1/8 x 5/16 x 5/16 inch are used versus when carrier rings having dimensions of about 1/8 x 1/4 x 1/4 inch are utilized. For the alternate cross-partitioned ring geometry, there is no disclosure of internal diameters. Thus, no effects with respect to catalyst performance resulting from varying the ratio of internal diameter to outside diameter of the carrier are disclosed. Therefore, the '938 reference does not recognize the ratio of internal diameter to outside diameter of the shaped support material as a result-effective variable.

Thus, the '231 reference and the '938 reference do not recognize that the ratio of internal diameter to outside diameter of the shaped support material is a result-effective variable.

MPEP § 2143 states:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

There is no suggestion or motivation to modify the '231 reference to arrive at the present invention in view of the teachings of the '938 reference since the '938 reference teaches away from the present invention. The carriers of the '938 reference which have internal diameters disclosed are nominally ring shaped carriers having dimensions of about 1/8 x 5/16 x 5/16 inch or about 1/8 x 1/4 x 1/4 inch. The internal diameters are 40 and 50 percent of the outside diameter of the carriers, respectively. Thus, the '938 reference teaches away from internal diameters upwardly to about 30 percent of the outside diameter of the shaped support material. Therefore, there is no suggestion or motivation to combine the '231 and '938 references to arrive at the present invention.

Additionally, there is no reasonable expectation of success. As discussed hereinbefore, the '231 reference is silent regarding varying the ratio of internal diameter to outside diameter of the shaped support material. The '938 reference generically teaches that the size and shape of the catalyst support are peculiar to the reactor employed, the gas flow required, and the pressure drop across the reactor. However, the examples in the '938 reference contain no data relating to the effects of varying the ratio of internal diameter to outside diameter of the shaped support material. In particular, the examples in the '938 reference do not disclose an improvement in the performance of the catalyst from varying the ratio of internal diameter to outside diameter of the shaped support material. Therefore, when combining the '231 and '938 references, there is no reasonable expectation of success in arriving at the present invention.

Further, the '231 and '938 references do not teach or suggest all the claim limitations. The references do not teach or suggest a shaped support material having a hollow cylinder geometric configuration such that the length-to-outside diameter ratio of said shaped support

material is in the range of from about 0.3 to about 2 and the internal diameter is in the range upwardly to about 30 percent of the outside diameter of said shaped support material.

In view of these arguments, Applicants believe that a *prima facie* basis for obviousness has not been established for Claims 1-12 and 14. Applicants respectfully request that the rejection be withdrawn.

4. Claims 13 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 4,532,231 hereinafter the '231 reference) in view of Liu et al (6,511,938 hereinafter the '938 reference) as applied to claims 1-12 and 14 above, and further in view of Thorsteinson et al. (US 5,187,140 hereinafter the '140 reference). This rejection is respectfully traversed. As discussed above, three criteria must be met to establish a *prima facie* basis for obviousness. The teachings of the '231 reference and the '938 reference have been discussed hereinbefore. The '140 reference teaches a process for the epoxidation of alkenes in the presence of a supported silver catalyst which has a high silver content, and the carrier has a high surface area and a high porosity. *U.S. Patent No. 5,187,140*, col. 6, ll. 24-33. Similar to the '938 reference, the '140 reference discloses that, in tubular reactors, supports may be rounded in shape, i.e., spheres, pellets, rings, cross-partitioned rings, tablets and the like, having diameters ranging from about 0.1 inches to about 0.8 inches. *Id.* at col. 9, ll. 24-32. The carriers utilized in the examples are carrier rings having dimensions of about 1/8 x 5/16 x 5/16 inch or about 1/8 x 1/4 x 1/4 inch. *Id.* at col. 22, ll. 45-46. In the Examples of the '140 reference, the data provided does not teach or suggest improved catalyst performance by changing the ratio of the nominal outside diameter to the nominal inside diameter of the hollow cylinder geometric configuration.

There is no suggestion or motivation to modify the '231 reference to arrive at the present invention in view of the teachings of the '938 and '140 references since both the '938 reference and the '140 reference teach away from the present invention. Both the '938 and the '140 references disclose carriers that are nominally ring shaped having dimensions of about 1/8 x 5/16 x 5/16 inch or about 1/8 x 1/4 x 1/4 inch. The internal diameters are 40 and 50 percent of the outside diameter of the carriers, respectively. Thus, the '140 reference also teaches away from internal diameters upwardly to about 30 percent of the outside diameter of the shaped support material. Therefore, there is no suggestion or motivation to combine the '231, '938 and '140 references to arrive at the present invention.

Additionally, there is no reasonable expectation of success. The '231 reference and the '938 reference have been discussed hereinbefore. The '140 reference discloses the same

carriers as described in the '938 reference; therefore, when combining the '231, '938 and '140 references, there is no reasonable expectation of success in arriving at the present invention.

Further, the '231, '938 and '140 references do not teach or suggest all the claim limitations. The references do not teach or suggest a shaped support material having a hollow cylinder geometric configuration such that the length-to-outside diameter ratio of said shaped support material is in the range of from about 0.3 to about 2 and the internal diameter is in the range upwardly to about 30 percent of the outside diameter of said shaped support material.

In view of these arguments, Applicants believe that a *prima facie* basis for obviousness has not been established for Claims 13 and 15 and respectfully request that the rejection be withdrawn.

### CONCLUSION

The rejections having been traversed, allowance of Claims 1-15 of the present application is respectfully requested. If the Examiner would like to discuss this case with Applicant's attorney, the Examiner is invited to contact Richard Lemuth at the phone number below.

Respectfully submitted,

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